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ABSTRACT

Haskell Indian Junior College's computer-managed instruction (CMI) reading program uses the computer to maintain records of student achievement; schedule student assignments and tests; provide students, teachers, and administrators with student progress reports; and compile, retrieve, and analyze data. Using classroom instruction and a mastery learning framework, the CMI program consists of comprehensive sets of three or four sequentially organized learning objectives, which pertain to published tests used in the reading program. Learners are informed of the objectives of each unit, which skills are being taught, and how they will achieve and demonstrate mastery. The first activity for each unit is preassessment to determine whether a student has the needed background and capabilities to complete a unit and to redirect students who lack this background or who have already mastered the unit's objectives. During the instructional cycle, several kinds of reports are computer-generated to identify instructional needs, select appropriate educational experiences, and chart learner progress. These reports include daily profile charts, and objective grouping, weekly, and yearly reports. The most important aspect of the program is a combination of preassessment, formative, and summative testing with directed learning. Test scores reveal that CMI students showed significantly greater gains in reading than students in regular reading classes. (KL)

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DEVELOPMENT OF A JUNIOR COLLEGE CMI READING INSTRUCTION PROGRAM

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A B S T R A C T

DEVELOPMENT OF A JUNIOR COLLEGE CMI READING INSTRUCTION PROGRAM

Paper presented at the annual meeting of the American Educational Research Association in New York City, March, 1982.

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The goal of this program was to develop a computer managed instructional program in reading based on an extended curriculum with teaching methods that have been proven successful in areas other than reading and to determine the effectiveness of that program. The program was developed on the basis of individualized instruction using the computer to provide feedback on student progress. The results indicated that the program was effective in bringing about higher levels of achievement in reading as well as higher levels of interest toward reading.

DEVELOPMENT OF A JUNIOR COLLEGE CMI READING INSTRUCTION PROGRAM

OBJECTIVES

The problem of low reading achievement with junior college students is pervasive because it affects nearly all other areas of instruction. In an effort to abate this problem, a computer managed instruction (CMI) program was conceptualized. The goal was to develop a computer managed instructional program based on an extended curriculum with teaching methods that have been proven successful in areas other than reading, and to determine the effectiveness of the CMI program.

RATIONALE

The CMI program was developed on the bases as individualized instruction, using the computer to maintain records of student achievement, schedule student assignments and testing, provide students with progress reports, sequence students through instruction, provide progress reports to teachers and administrators as needed, compile statistical data, and to retrieve and analyze stored data on request. The program was developed on the basis of procedures and functions of CMI as advocated by Perry and Keyser (1979), Joiner, Miller, and Silverstein (1980), and Allen (1980).

PROGRAM DESCRIPTION

The CMI program was developed so that the basic classroom mode of instruction would remain intact. As with regular instruction, the entire class receives instruction on a unit with the addition of individualized daily reports of progress as well as at the end of each unit of instruction. All students are tested for mastery of the objectives of each unit and individual deficiencies are identified. Students who fail to reach a pre-determined level of mastery are given additional assistance as prescribed by the computer. Students are thus able to master each unit of instruction in sequence.

The major components of Haskell's CMI program consists of (1) a comprehensive set of learner objectives for each unit, (2) frequent formative diagnosis and evaluation for each unit and through the semester, (3) prescribed corrective and remedial instruction for each unit, and (4) criterion referenced summative testing over each unit and over each semester's work.

PROGRAM DEVELOPMENT CONSTRAINTS

The program had to be usable within the confines of the regular school day, since it was unrealistic to assume that students requiring extra work would do it outside of regular school hours. The CMI program could not require a large financial investment for implementation since this was not available. Also, it had to be usable within the regular classroom format using resources currently available by one teacher with up to 30 students per class. The program had to be developed around the current instructional materials available since funds were not available for purchase of additional materials. The most important considerations focused on the selection of a method of instruction and the content of each unit. The main criterion for selection of a method of instruction was whether or not there was a sequence progressing from simple to complex concepts. Agreement had to be reached not only among the reading staff but also among faculty in related units.

SPECIFIC DESCRIPTION OF HASKELL'S CMI READING PROGRAM

The Haskell CMI program consists of many reading objectives arranged sequentially in blocks that represent roughly a semester's worth of instruction. Specific objectives have been organized into teacher learning units. Instructional materials for each unit were developed following the mastery learning framework.

Most units include a series of three or four teaching activities in a sequence designed to lead the learner to acquire basic

skills. Students are given a list of the objectives to be covered in each unit with the specific set of expectations for each objective. This specification of instructional objectives gives the student an orientation toward learning and direction toward accomplishing or mastering those objectives. Students are told why it is important that they master the material presented and where this fits in the learning sequence. Thus, the student is given the rationale of the program so that learning becomes more meaningful.

Most of the units included all of the activities contained in the published workbooks used in the reading program. Instructional cues were presented to the learner about what skills were being taught, how students could demonstrate mastery, and what steps they would go through to complete mastery.

The first activity for each unit was to go through the pre-assessment procedures. This consisted of a diagnostic test and/or completion of reading assignments. Based on the instructional objectives for a particular learning sequence, the pre-assessment determined whether or not a student had the prerequisite background and capabilities to complete that unique, whether or not the student possessed the skills, attitudes, or knowledge specified in the objectives for that unit, and where a student should be placed in the graduated sequence of learner activities. A student would be re-directed when the pre-assessment indicated that he/she lacked the prerequisites or that these objectives were already mastered.

During the instructional cycle, several kinds of reports were computer generated for identifying instructional needs, selecting appropriate educational experiences, and charting learner progress. The daily profile chart created by the CMI program contained an alphabetical listing of all students with their current activity progress and test results for each objective. For each student, the program

listed the objectives programmed for that student and the questions missed for each objective. This report was generated from a daily up-dating of each student's progress. This was done at the end of each instructional day, and the daily report was available at the beginning of the next day's instruction.

An "Objective Grouping" report is also run on a daily basis, and this report is organized by objectives. Each objective is sequentially listed in order from simple to complex, and for each objective an alphabetical listing of all students who are scheduled for that objective, are completing that objective, or have completed that objective is given. Thus, this report indicates which students are currently involved with each objective.

A "Weekly Report" indicates which objectives each student in each class has completed during that week. If a student did not complete any objectives during that week, this report will note this and indicate which objectives were attempted that week. This report also indicates the progress to date for each student during that current year. This report was created at the end of the week and was available to students and instructors on Monday mornings.

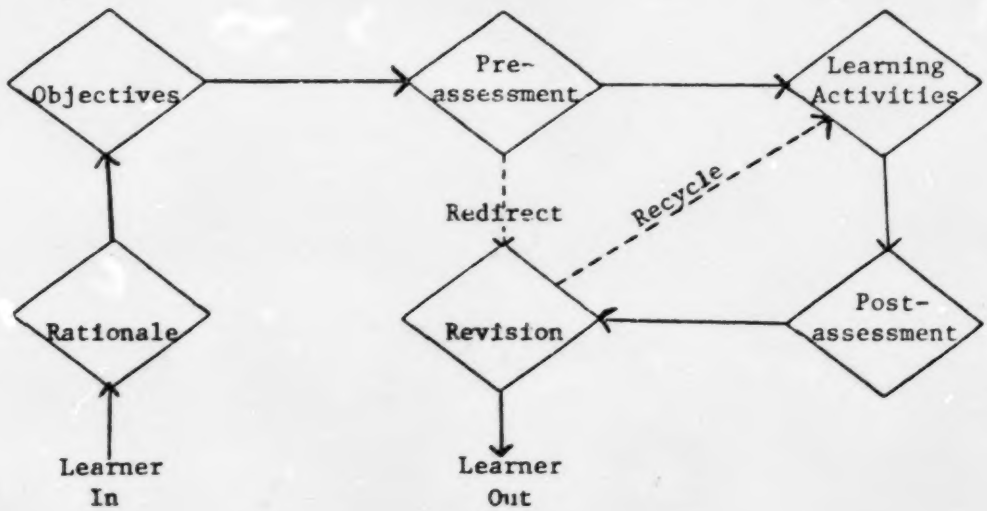
The "Yearly Report" gives a cumulative report for each student during the year, indicating each objective completed, test results, what remedial work was scheduled and completed, and the date on which each objective was completed. This year-end report is used to schedule reading assignments for the coming year.

The most important aspect of the CMI program is the combination of testing with directed learning. Pre-test assessment or diagnostic testing is used to place students in the learning sequence. Formative testing during the progress through each

unit provides feedback to both the instructor and the student regarding learner progress and whether or not remediation work is necessary. Summative testing is used to determine whether or not the student has mastered the concepts in each unit. If remediation work is specified, this is done on an individual basis within the confines of the regular class. The instructor serves as a resource person for each student, aiding students as required as each student progresses through the assigned remedial work. Supplementary workbooks are usually used for this remedial work. The same type of instructional cycle is used for remedial work. When this work is completed, the student is then recycled into the regular course work for the objectives of that unit.

Each student is given an overview of the sequence using the following diagram of the instructional system. Thus, each student has an understanding of the CMI program, its objectives, and how each student will progress toward mastery.

INSTRUCTIONAL SYSTEM



COMPARATIVE ANALYSES. To date, 1,220 students have gone through various CMI reading programs. The Nelson-Denny Reading Test was used to compare the reading achievement of 101 students enrolled in the introductory reading courses in the regular classes without CMI compared to 119 students who took the same introductory reading courses with the CMI program. A pretest-posttest design was used using the repeated measures analysis of variance which revealed significant main effects for testing (pretest to post-test difference) and significant interaction effects for Vocabulary, Comprehension, and Composite scores. ($P < .01$) For each analysis, the CMI students started at a lower level than the regular students and ended at a higher level. Thus, the results indicate that the students in the CMI program had higher achievement gains than regular students. Compared to students in the regular program, the CMI students gained significantly more in the same time period using the same resources other than CMI.

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